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## Assessing the effectiveness of a community based screening program

### Abstract

The purpose of this study is to analyze the community-based screening process that is currently used by the National Children's Vision Foundation (NCVF) and compare it to other existing screening programs. Retrospective data describing the results of the community-based school vision screening was collected from an on site-visit, interview, and e-mail correspondence with the NCVF screening coordinator. The screening battery used is a modified NYSOA. Because it is just a modified NYSOA, its efficacy in detecting significant refractive and binocular vision conditions should be the same as the NYSOA. An important aspect of this particular screening was found to be the follow up process, which included surveys that were to be completed by teachers and eye care professionals post screening. The teacher follow-up was found to be 78%. From this we know that 35.7% of the children referred received glasses and or vision therapy. The NCVF screening is potentially very effective and valid and further study of its validity would be beneficial in further improving the vision screening process and delineating which screening protocols are most effective in terms of accuracy, cost, and effect upon school performance.

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**ASSESSING THE EFFECTIVENESS OF A  
COMMUNITY BASED SCREENING PROGRAM**

By

**JOCELYN BASCO**

**JESSICA BEEDLE**

**A thesis** submitted to the **faculty** of the  
College of **Optometry**  
**Pacific** University  
Forest Grove, Oregon  
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**Doctor** of Optometry  
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**Advisor:**

**J P LOWERY, OD**

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## Biographies

Jocelyn Basco graduated from the University of California San Diego, Revelle College, with a BS in Biology and a minor **in Psychology**. Following **the receipt of the** Doctor of Optometry degree, she **hopes to pursue a clinical career in optometry**.

**Jessica Beedle** graduated **from Pacific University in Forest Grove Oregon** with **a BS in Biology** and **a minor in Psychology**. **She plans to pursue a career in clinical optometry upon completion of her Doctorate of Optometry.**

## **Abstract**

The purpose of this study is to analyze the community-based screening process that is currently used by the National Children's Vision Foundation (NCVF) and compare it to other existing screening programs. Retrospective data describing the results of the community-based school vision screening was collected from an on site-visit, interview, and e-mail correspondence with the NCVF screening coordinator. The screening battery used is a modified NYSOA. Because it is just a modified NYSOA, its efficacy in detecting significant refractive and binocular vision conditions should be the same as the NYSOA. An important aspect of this particular screening was found to be the follow up process, which included surveys that were to be completed by teachers and eye care professionals post screening. The teacher follow-up was found to be 78%. From this we know that 35.7% of the children referred received glasses and or vision therapy. The NCVF screening is potentially very effective and valid and further study of its validity would be beneficial in further improving the vision screening process and delineating which screening protocols are most effective in terms of accuracy, cost, and effect upon school performance.

## Acknowledgements

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## Introduction

A screening is defined as the application of simple and inexpensive tests to search for significant health disorders in a population, however, they are not diagnostic and those who test positive must be referred for a diagnostic evaluation to confirm the presence or absence of disease. So, why do vision screenings? Perhaps Bailey states the most important reason: "Undetected and untreated eye and vision problems in school-age children can interfere with the learning process."<sup>1</sup> Schmidt writes that, "the goal of vision screening, then, is to identify children who need professional attention so they can benefit from early intervention or to monitor conditions for later treatment."<sup>2</sup>

Vision is a fundamental factor in the learning process. In identifying learning related vision problems the three areas of visual function that need to be evaluated are visual pathway integrity, visual efficiency, and vision information processing. The first includes eye health, visual acuity, and refractive status. The second eye movements, binocularity (eye teaming and fusion) and accommodation. The last includes identification and discrimination, spatial awareness, and integration with other senses.<sup>3</sup> Vision conditions that can have an effect on visual function especially as related to school performance include hyperopia, astigmatism, myopia, convergence excess, convergence insufficiency, accommodative infacility, accommodative insufficiency, strabismus and poor oculomotor skills. Krumholtz, in a study to assess the predictive ability of vision screening on school performance, found that eye movement testing and hyperopia assessment showed significant correlation with citywide achievement test scores.<sup>4</sup> He also wrote that "early detection and remediation increased the potential for more effective learning."<sup>4</sup>

The prevalence of ocular disease and vision conditions in the pediatric population is such that the use of vision screenings for this group would be beneficial. See Table 1. The data from this study represents a clinical population and may not reflect the prevalence of these conditions in kids randomly pulled off the street. These vision problems are not readily recognizable to the general public and so those who are affected may seem to be asymptomatic. Moreover, these conditions are treatable! Screenings to identify and provide guidance as to the type of care needed for those at risk is important. Hence, for all the above reasons, a screening for vision disorders is justifiable.

**Table 1: Prevalence of Vision and Ocular Disease Conditions in a pediatric population of 6 to 18 year olds (Scheiman, Galloway, et al)<sup>5</sup>**

<u>Condition</u>	<u>Percentage</u>
1. hyperopia	23%
2. astigmatism	22.5%
3. myopia	20.2%
4. convergence excess	8.2%
5. amblyopia	6.8%
6. accommodative disorders	6.5%
7. esotropia	5.3%
8. convergence insufficiency	5.3%
9. exotropia	4.2%
10. ocular disease conditions	3.5%

### ***Screening Effectiveness***

Since the need for vision screening has been established, the effectiveness of the screening is to be considered next. To evaluate the quality of a screening (accuracy, effectiveness, and efficiency), one must examine the screening in terms of its reliability and validity.<sup>6</sup> Reliability is a measure of the screenings repeatability. The validity of a screening is usually measured in terms of sensitivity and specificity. The *sensitivity* of a screening is its ability to correctly identify those with a disease, termed *truepositives*.

The *specificity* is its ability to correctly identify those without the disease, termed true negatives. Ideally, a screening would correctly refer only those with the condition(s) sought. In practice, this is never achieved; there will also be those who the screening fails to identify, false negatives, and those the screening refers out who do not have the condition, termed false positives. In addition, the prevalence of the disease will affect these values. "That is, when the prevalence is low even a highly specific test will give a relatively large number of false positives." Thus, a screening must balance the referral criteria so that both over-referrals and under-referrals are minimized. (See Fig 1)

		Diagnosis of Vision Problem	
		+	-
Vision Screening Results	+	A True positives	B False positives
	-	C False negatives	D True negatives

**Figure 1 Table to evaluate the validity of a screening program (Mozlin R)<sup>8</sup>**

Sensitivity=  $A/A+C$

PPV=  $A/A+B$  (positive predictive value)

Specificity=  $D/B+D$

NPV=  $D/C+D$  (negative predictive value)

Prevalence=  $A+C/A+B+C+D$

The process of successfully identifying children needing care is only one element of a successful screening program. In Table 2, Wilson and Junger summarize what constitutes an effective screening program. One factor not listed in their guidelines but of great importance to consider, is the follow-up of screening failures. The extent to which most school-based screenings go is to notify parents their child was needs additional care. Without additional follow-up, a screening cannot be deemed effective because there is no way to ensure that the identified child received the care he or she needed.

**Table 2: Ten guidelines for an effective screening program (Wilson & Junger)<sup>9</sup>**

1. The condition sought should be an important health problem
2. There should be an accepted treatment for the disease
3. Facilities for diagnosis and treatment should be available
4. There should be a recognizable latent or early symptomatic stage
5. There should be a suitable test or examination
6. The test should be acceptable to the population
7. The natural history of condition should be adequately understood
8. There should be an agreed policy on whom to treat as patients
9. The cost of case-finding should be economically balanced in relation to possible expenditures on medical care as a whole
10. Case-finding should be a continuing process and not a "once and for all" project

For an effective screening, it is also important that appropriately trained and educated individuals perform the vision screening. Zaba, Mozlin, and Reynolds" found that vision screenings done by pediatricians and family physicians on children prior to entering school for the first time failed to identify and refer all those with vision problems. Their study found that in some pediatric practices vision screenings were not even done on all their patients, even after receiving training in vision screening. The other problem cited was lack of follow-up care and compliance by parents for those who tested positive. This was due to poor communication with parents, thus delaying comprehensive evaluation by an eye care professional. This again illustrates the importance of adequate follow up as part of an effective screening program.

Ultimately it is the parents' responsibility to provide all of the necessary medical care for their children. This in itself presents a problem, as most parents are not trained to recognize medical problems. Most parents will recognize the basic, common childhood problems such as chicken pox, the flu, a broken arm, but when faced with the task of identifying common vision problems such as hyperopia, anisometropia and non-strabismic vision disorders, parents are at a loss. Most children will not complain of vision problems and if the parents are unaware, then no care will be sought out and the problem will remain undetected. It is up to vision care specialists to help educate the

public on the need for vision care, and in turn, to implement effective screening processes.

The education of parents, teachers, and the public about the relationship between vision and learning will enhance the success of vision screening. This enables them to understand the importance of follow up care and to get children the help they need to succeed academically and in life. Since vision care professionals cannot donate all of their time to providing screenings, it would be ideal for them to develop a screening process that incorporates volunteers. Trained volunteers and increased public awareness will help eye care professionals provide better vision care for our children.

### ***Screening Protocols***

According to Schmidt, "no uniform procedure is in use across the country and there is no general agreement as to what aspects of vision should be included in a screening battery or what reference criteria should be."<sup>2</sup> Many vision-screening programs exist, including the Modified Clinical Technique that was "normed" by the Orinda Study". The New York State Optometric Association (NYSOA) battery is another commonly used, validated screening<sup>1</sup>. The best screenings are easy to administer, short, accurate, cost effective, and get help to those identified as needing attention. Most screenings include tests of visual acuity, eye movement and muscle balance, fusion, color and disease.

### ***The National Children's Vision Foundation***

The National Children's Vision Foundation (NCVF) is a non-profit organization based in Bend, Oregon. The NCVF helps to identify vision problems in children by providing vision screenings in both public and private schools and in juvenile detention centers as well. The NCVF also coordinates financial aid programs and provides some financial aid to children in need of care.<sup>13,14</sup>

The NCVF utilizes a modified version of the New York State Optometric Association (NYSOA) battery (modification to be discussed fully in the results section). The NCVF coordinates with school administrators, communities, and volunteers to conduct the screening. Results and recommendations to see an eye care professional are sent to *both* parents and educators. A distinctive aspect of the NCVF program is the effort to follow up on students who fail the screening, giving this particular screening protocol the potential to be both prescriptive and investigative.<sup>4</sup> To clarify: Studies to validate the screening and studies to determine the effect the screening has on academic performance can be done in an effort to better quantify costs, benefits, and improve the quality of screenings.

The goal of this study is to analyze the community-based screening process that is currently used by the NCVF and compare it to other existing screening programs. To determine its success, we look to the tests, the administration of the tests, and costs, and compare/contrast these with the other major screening techniques in use. We will present what we feel are advantages, disadvantages, and suggestions for improvement and hopefully, greater success.

## **Methods**

Retrospective data describing the results of the community-based school vision screening were collected from an on site-visit, interview, and e-mail correspondence with the NCVF screening coordinator. No additional testing of the children was performed for the purpose of this study. NCVF also provided literature regarding their foundation. No names or other identifying information was made available.

The data received was compiled and organized for comparison and data analysis. Data from the 2003-2004 screening was incomplete so only a partial analysis was done. Referral rates were obtained from both the 2002-2003 and 2003-2004 data. A comparison of 2002-2003 screening failures to the prevalence of certain conditions and to screening failures of other studies was attempted. Information based on survey data was also of some value to outcome determination, providing insight into post-screening care.

## **Results**

According to the NCVF coordinator, the **Bend-LaPine** School District is the only district in Oregon that has initiated a plan to incorporate mandatory vision screenings for all students. To implement this plan, a community based screening program was created. This program is a partnership between the school district and the National Children's Vision Foundation. The school and NCVF have an agreement that all second and fourth graders, as well as student referrals from other grade levels, will be screened. Children are only excluded from the screening at the parents' request.

The main role of the school district is to provide program support. The school provides a location, helps with set up and clean up, and schedules the students accordingly. Both the school district and the NCVF utilize volunteers to help carry out the screening process. The school nurses and teachers make the referrals for students not scheduled for a screening that year.

The NCVF volunteers are comprised of Lions Club members and retired association members, such as AARP. The volunteers are initially trained on site the day of the screening. They arrive at the screening site 20 minutes early and are trained for each station. Many volunteers participate in more than one screening and thus are only trained for their first screening. The NCVF coordinator monitors the entire screening, observing both the volunteers and children to ensure the tests are being performed properly and to guarantee the children make it through the entire circuit.

### ***Screening Set Up:***

The school initiates the screening process by contacting the NCVF. After contacting their volunteers, the NCVF takes the school provided class lists and creates score sheets with the student name, teacher name and grade, school name, date and age. School volunteers accompany the children in groups of 8 to 30 to the screening site,



where seven stations are set up for the children to travel through.

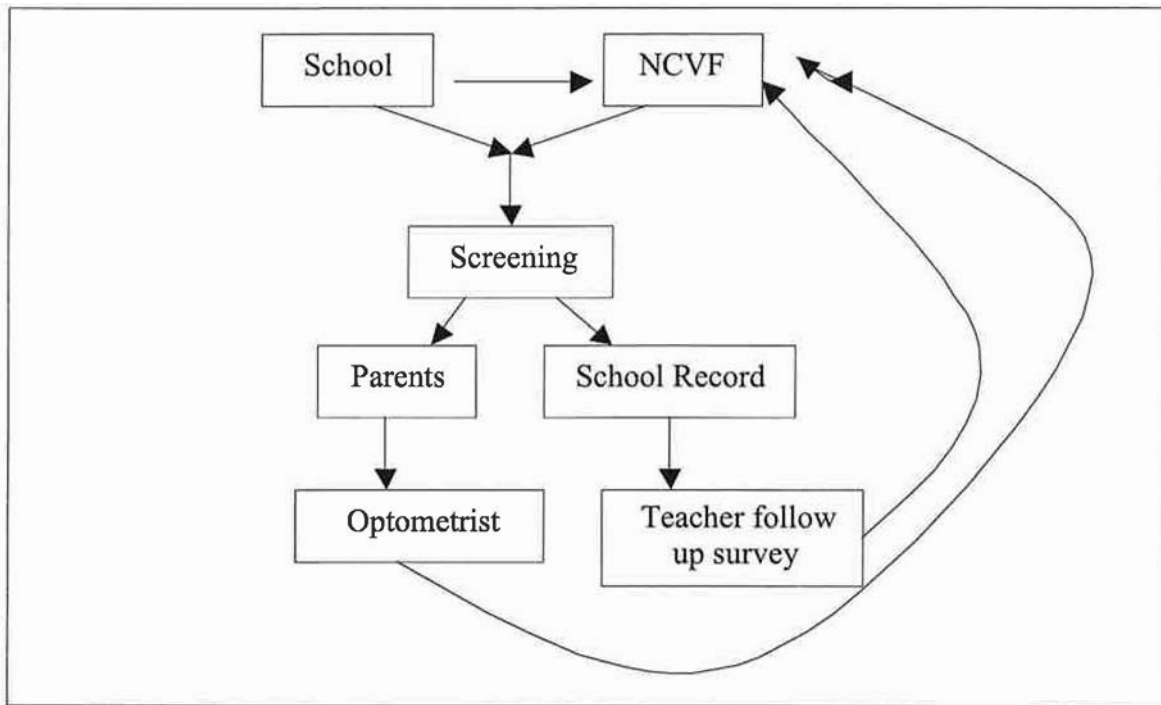
The screening battery used is a modified NYSOA. The seven (rather than nine) screening stations consist of (1) distance acuity, (2) hyperopia, (3) near acuity, (4) depth perception, (5) near point of convergence (NPC), (6) fusion at distance, near and vertical balance, and (7) eye tracking. NCVF removed the color test and visual-motor integration test (copy forms) from the battery because of time issues, the less imperative nature of color deficiency status, and the lack of accuracy with the copy forms test. New volunteers administer depth perception and near acuity tests; seasoned volunteers administer distance acuity, eye tracking, and fusion (done in a stereoscope) tests.

It takes approximately 10 minutes for each child to complete the entire circuit. Each child carries his or her score sheet from station to station as he or she rotates through and presents it to the NCVF coordinator, at station 5, upon completion. There is no specific order the child must follow when traveling from station to station with the exception that station five, must be completed last. Scoring is also modified: instead of P/F (pass/fail) used by the NYSOA, the numbers 1 and 2 are used so the children will less likely be aware of their score. See appendix for test descriptions and criteria and a sample recording form.

Each score sheet is individually scored by the NCVF coordinator, who then determines a pass or fail mark for each. Once the NCVF determines a child has failed the screening, the child is scheduled for a re-screen 3-4 weeks later. The NCVF coordinator herself administers this re-screen. If the child fails the re-screen, a packet is sent out to the parents detailing the results. This packet includes 4 items: a referral letter from the NCVF which gives information about the foundation and details of the screening program, a letter from the school summarizing the results of the screening, a copy of the screening report (score sheet) and a doctor exam reporting form that is to be given to the optometrist or ophthalmologist that performs the recommended comprehensive vision examination. See appendix for samples of each letter and the doctor form.

### ***Screening Follow-up:***

Step 1: Parent notification. The parents are notified via mail from the school and the foundation as to the problems their child is having. They are provided with information about the foundation, details of the vision deficit and a form to bring with them to the doctor. Step2: Doctor form. The doctor form is intended to provide feedback to the Foundation as to the care the child received, the diagnosis of any impairment and what treatment was needed. It must be filled out by the doctor and sent back to the NCVF. This serves two purposes. First, it keeps the Foundation and school apprised of the care the child is receiving; and second, it is a good check for the screening process to determine its *outcome value*. Step 3: Teacher Form. About three to four months after the initial screening, a survey is sent out to all of the teachers. The teachers' task is to report if the child received any follow-up care, such as a comprehensive eye exam or vision therapy, and if they are wearing any correction. Any improvements in school performance are also reported. If the teacher is unsure of what follow up care the child received, or feels that they need additional care, the teacher can request that the Foundation contact the parents. The Foundation will then call the parents to discuss the screening results and the vision needs of the child. Figure 2 provides an overview of the entire process.



**Figure 2 Flowchart of NCVF screening process**

School contacts NCVF; both school and NCVF work together to coordinate screening; results are sent to parents and put in child's permanent file; parents will contact optometrist; optometrist will then send report to NCVF; teacher completes vision survey 2-3 months after screening and sends report to NCVF

***Data collected from screenings:***

	2002-2003		2003-2004	
Total screened	1974		1696	
Total referred	395	20% failure rate	288	17% failure rate

**Table 3 Vision Screening Program Statistics**

2002-2003 data from the thirteen public schools in the Bend-LaPine district.

2003-2004 data from 11 of the 13 public schools in the Bend-LaPine district.

<i>subtest failed</i>	<i>no.</i>	
distance VA	171	8.7%
near VA	124	6.3%
convergence	22	1.1%
fusion	163	8.3%
tracking	183	9.3%

**Table 4 2002-2003 Failures**

- The number of failures exceeds the number referred because some children failed more than one subtest.
- Those failing the subtests for hyperopia and depth perception were not specified in the data provided. It is unknown if they were included in one of the other subtests or just left out.

<i>type of follow-up</i>	<i>total</i>	
teacher	307	78%
doctor	25	6%

**Table 5 2002-2003 Survey return (of those referred)**

<i>type of secondary care received</i>	<i>total</i>
professional care (ie.exam)	194

<i>treatment resulting from professional care...</i>	
glasses only (total)	130
new	109
previous wearer or unspecified	21
vision therapy	5
vision therapy & glasses	6
glasses not needed	22
no tx (ie. glasses or vision therapy) listed; unable to assume that neither was required	31

**Table 6 Follow-up information collected from teacher survey 2002-2003**

## Discussion

So, how does the NCVF screening stack up to other screening batteries? Table 7 compares the components of three major specific screening batteries to the NCVF; namely, the Massachusetts Vision Test (MVT), the Modified Clinical Technique (MCT), and the New York State Optometric Association (NYSOA) Vision Screening Battery."

**Table 7 Comparison of several vision screening batteries**  
Specific Vision Screening Batteries

	MVT	MCT	NYSOA	NCVF
<b>Acuity</b>				
Near Point	X		X	X
Far Point	X	X	X	X
<b>Accommodation</b>				
Hyperopia	X	X	X	X
<b>Sensory-Motor Coordination</b>				
Convergence			X	X
Fusion - Near			X	X
Far			X	X
Stereopsis			X	X
<b>Muscle Balance</b>				
Vertical	X		X	X
Near	X	X	X	X
Far	X	X	X	X
Eye Tracking			X	X
<b>Visual-Motor Integration</b>			X	
<b>Other Factors</b>				
Color			X	
<b>Need for Highly Trained Specialist</b>		X		

One major difference between the MCT and the others is that it incorporates retinoscopy and ophthalmoscopy, thus requiring an optometrist or ophthalmologist to be present. The others all utilize volunteers to administer the tests and to run the screening, making them more cost effective programs. Included as part of the NCVF screening program, but lacking in the others, is protocols for follow up care. Perhaps only a few, if any, other screening programs do this.

An important issue to consider at this time is the validity of these different screening programs, including that of the NCVF. To establish the validity of a screening protocol, a full exam is required for each child who participated. This is needed to check reliability, specifically, to get measures of specificity and sensitivity. The validity of the

MCT was established by the Orinda study, which also established it as the standard for school vision screening programs. The MCT was found to have a 96% sensitivity and a 98% specificity.<sup>8</sup> In one study, the NYSOA was found to have 71.7% sensitivity and 65% specificity.<sup>12</sup> And, in another study the MVT, was found to have 65% sensitivity and 68% specificity.<sup>16</sup> At this time there has been no formal study done to assess the validity of the NCVF screening battery, which would allow us to make a direct comparison to the other programs. The NCVF screening battery however is just the NYSOA without the color and visual motor integration tests, which are considered a low priority by most eye care professionals. Thus, the NCVF sensitivity and specificity should be about the same as the NYSOA.

A comparison of the NCVF failures (table 4) to the failures in the validation study of the NYSOA screening battery done by Lieberman et al<sup>12</sup> may provide a hint as to the efficacy of this screening battery. This must be limited to the same subtests (table 8). The failures for near acuities are near identical.

NCVF		NYSOA validation study
	<i>%fail</i>	<i>%fail</i>
distance VA	8.7%	10.6% Snellen farpoint
near VA	6.3%	6.4% Snellen nearpoint
convergence	1.1%	4.6% Bell push up
tracking	9.3%	22.6% NYSOA King-Devick

**Table 8 Comparison of sample subtest failures**

Data from the follow-up surveys provide us with some indication of the screening program's effectiveness as well (table 6).

While the added follow up care is an excellent addition to the vision screening provided by the NCVF, several factors could be improved (see table 5). The return rate of the doctor follow up forms is only at 6%, which limits the validity of outcome assessment and leaves the teacher survey the only part of the follow up care intact, but

there are additional issues with its validity as well. The teacher follow up forms are based upon personal observation and opinion. The teacher may also have little knowledge of the child's vision condition and how it can affect academic performance. A report from the doctor will be much more effective in clarifying the nature of a vision problem diagnosed, what treatment has been prescribed and how the teacher and parent can make sure vision is enhanced in the classroom. For example, glasses may be prescribed for specific distances or tasks but teachers are unaware of these parameters and, therefore, are not in a position to encourage the appropriate use of spectacles.

## **Conclusions and Recommendations**

The NCVF screening was not set up with data analysis for research purposes in mind. The manner in which data is collected and compiled makes it difficult to analyze the results and assess the validity and effectiveness of the program.. However, there are some useful pieces of data that can be used to evaluate the efficacy of this screening process. The 78% teacher follow-up is excellent. From this we know that 35.7% of the children referred received glasses and or vision therapy. Given that the NCVF screening battery is just a modified NYSOA, its efficacy in detecting significant refractive and binocular vision conditions should be the same as the NYSOA.

The NCVF screening is potentially very effective and valid and further study of its validity would be beneficial in further improving the vision screening process and delineating which screening protocols are most effective in terms of accuracy, cost, and effect upon school performance. Ultimately, it will be the children that benefit most from an effective vision-screening program.



## References

1. Bailey RN. Assessing the predictive ability of the test-positive findings of an elementary school vision screening. *Optometry and Vision Science* 1998; 75: 682-91.
2. Schmidt P. Vision Screening. In: Rosenbloom A, Morgan M, editors. *Principles and Practices of Pediatric Optometry*. Philadelphia: Lippincott-Raven; 1990. p. 468-85.
3. The American Academy of Optometry and the American Optometric Association. Special Commentary: Vision, Learning, and Dyslexia-A Joint Organizational Policy Statement of the American Academy of Optometry and the American Optometric Association. *Journal of the American Optometric Association* 1997; 68: 284-6.
4. Krumholtz I. Results from a pediatric vision screening and its ability to predict academic performance. *Optometry* 2000; 71: 426-30.
5. Scheiman and Galloway. Prevalence of vision and ocular disease conditions in a clinical pediatric population. *Journal of the American Optometric Association* 1996; 67: 193-202.
6. Fukai ME, Matsumoto, DM, Neumaier RW. Screening Principles. In: Newcom R, Marshall E. *Public health and community optometry*. Butterworth 1990, p. 85-96.
7. Myrowitz E. A public health perspective on vision screening. *American Journal of Optometry & Physiological Optics* 1984; 61: 359-60.
8. Mozlin R. The epidemiology of school vision screenings. *Journal of Behavioral Optometry* 2002; 13: 59-64.
9. Wilson JMG, Junger G. *Principles and Practice for Disease*. Public Health Papers No.34; Geneva: World Health Organization, 1968.
10. Zaba JN, Mozlin R, Reynolds WT. Insights on the efficacy of vision examinations & vision screenings for children first entering school. *Journal of Behavioral Optometry* 2003; 14: 123-6.
11. Blum HL, Peters HB, Bettman JW, Fellows V, Johnson F. Design and evaluation of a vision screening program for elementary school children. *Am J Public Health* 1959; 49: 1670-81.

12. **Lieberman S, Cohen AH, Stolzberg M, Ritty JM. Validation study of the New York State Optometric Association (NYSOA) Vision Screening Battery, American Journal of Optometry & Physiological Optics 1985; 62: 165-8.**
13. **National Children's Vision Foundation. NCVF Community Impact Statement 2003.**
14. **Dolson E. Sisters children to have eyes checked. The Nugget Newspaper 2002 April 09.**
15. **N.Y.S.O.A. Vision Screening Battery Manual. Bernell Corporation, 1986. 750 Lincolnway East. PO Box 4637. South Bend, Indiana 46634.**
16. **Yasuna ER, Green LS. An evaluation of the Massachusetts vision test for visual screening of school children. Am J Ophthalmology 1952; 35: 235-40.**

## **Appendix**

Test descriptions and criteria

Recording Form

Follow-up Forms

- NCVF letter
- School letter
- Doctor form
- Teacher survey

# The Classroom Vision Performance Screening

*Modified from the NYSOA vision screening battery*

## Test descriptions and criteria

1. **Far Visual Acuity** – Each eye is tested at 20 feet to identify the lowest line of letters that they can. Number “2” is marked if the acuity for either eye is 20/40 or worse (higher number) or if there is a 2 line difference between the eyes (right eye 20/20 and left eye 20/30).
2. **Hyperopia (farsightedness)** – Each eye is tested at 20 feet with a +1.50 powered lens in front of the eye and asked to identify the lowest line of letters. Number “2” is marked if they can see the same line as in Far Visual Acuity. If they can not see that line, they pass.
3. **Near Visual Acuity** – Each eye is tested at 16 inches to identify the lowest line. Number “2” is marked if the acuity for either eye is 20/40 or worse (higher number) or if there is a 2 line difference between the eyes (right eye 20/20 and left eye 20/30).
4. **Depth Perception** – The child is asked to look at some “wired circles” with polarizing glasses on and identify which circle in each group is “jumping out”. The score is recorded as the highest number correct out of 9. If they can only see the circle on #6 or lower, then mark “2”. If they can see #8 but missed two of the earlier ones, they still could see #8 so they get “1”. They must see #7 or higher to pass.
5. **Near Point of Convergence** – The child is asked to follow a bead in towards their nose and indicate when it breaks into 2 beads. If the break is outside of 4 inches from their nose, then mark “2”. If the tester sees an eye turn out outside of 4 inches it is also a “2”. This test needs to be repeated at least twice, especially if they don't understand it.
6. **Fusion** – This test is done in the “stereoscope”. It tests near and far fusion and vertical alignment. If the child sees 2 or 4 balls when looking at the fusion cards then it is a “2”. This test must be done carefully, with full explanation and demonstration to the child. If they do not see three balls, ask them if they can pull them into three balls. If on the vertical card the yellow line is not touching or at least pointing towards the red ball, mark “2”. This test also needs to be repeated if they do not understand or get it the first time.
7. **Tracking** – The child is timed while calling out numbers across a page. If the child is 6 years old, only do the first test. The times are added up and compared to the norms for their age. Mark “2” if their time is greater than the norm + the standard deviation. *If the child is over by 10 seconds or less, a failure is only made if the child is also having trouble with reading.*

Age 6: test 1 only:	41.08 sec	1 error
Age 7: total:	126.05 sec	12 errors
Age 8: total:	106.48 sec	4 errors
Age 9: total:	99.47 sec	3 errors
Age 10: total:	94.49 sec	2 errors

Errors are counted as any missed (not mis-read) numbers or missed lines.

# VISION SCREENING REPORT

Based on the NYSOA Vision Screening Battery

**Please Note:** This is a vision screening performed by the National Children's Vision Foundation and volunteers, and does not take the place of a comprehensive eye examination. It should detect obvious vision problems. It does not detect eye health problems and the person administering it is not responsible for failure to detect eye health problems. A comprehensive dilated eye exam is recommended if there is any indication of decreased performance on any of the skills screened below. Prescriptions for eyeglasses or contact lenses can only be given from a comprehensive exam.

School: \_\_\_\_\_

Date: \_\_\_\_\_

Child's Name: \_\_\_\_\_

Age: \_\_\_\_\_ Grade: \_\_\_\_\_

Teacher: \_\_\_\_\_

Gender: M F

Glasses: Y N

**1 Far Visual Acuity:**  
Right Eye: \_\_\_\_\_ 1 / 2  
Left Eye: \_\_\_\_\_ 1 / 2  
("2" if 20/40 or worse in either eye  
or 2 line difference between eyes)

**6 Fusion at near:** 1 / 2  
("2" if 2 or 4 balls)  
**Fusion at distance:** 1 / 2  
("2" if 2 or 4 balls)  
**Vertical Imbalance:** 1 / 2  
("2" if line not through circle)

**2 Hyperopia:** +1.50 lens  
Right Eye: \_\_\_\_\_ 1 / 2  
Left Eye: \_\_\_\_\_ 1 / 2  
("2" if can read the line they  
could read in test #1)

**3 Near Visual Acuity:**  
Right Eye: \_\_\_\_\_ 1 / 2  
Left Eye: \_\_\_\_\_ 1 / 2  
("2" if 20/40 or worse  
or 2 line difference between eyes)

**7 Eye Tracking:**  
  
King Devick: Time Errors  
  
Test I \_\_\_\_\_  
  
Test II \_\_\_\_\_  
  
Test III \_\_\_\_\_  
  
Total \_\_\_\_\_

**4 Depth Perception:** \_\_\_\_\_ / 9 1 / 2  
("2" if 6 or less)

Age: \_\_\_\_\_ 1 / 2  
("2" if when norm + one SD is  
exceeded)

**5 Near Point of Convergence:** \_\_\_\_\_ 1 / 2  
("2" if break greater than 4 inches)

## Results:

[ ] Unsatisfactory performance was noted on one or more of the above visual tasks.

[ ] Satisfactory performance was noted on all skills screened.



520 NW Wall Street  
Bend, Oregon 97701-2699  
(541) 383-6000

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Date \_\_\_\_\_

To the Parents or Guardians of \_\_\_\_\_

Your child recently participated in a Classroom Vision Performance Screening. Visual skills such as tracking, fusion and near vision that have been identified as critical skills necessary for efficient reading and general classroom performance were screened. Lack of these skills may lead to frustration in the learning environment and sometimes to disinterest in school. Early identification and treatment of these problems has been shown to increase the academic success of the students in the school setting.

Results from your child's screening indicate that he/she *may* have difficulty with:

\_\_\_\_\_ **Visual Acuity** – This relates to the need for glasses to see clearly to compensate for near-sightedness, far-sightedness or astigmatism.

\_\_\_\_\_ **Convergence** – This relates to double vision when looking up close.

\_\_\_\_\_ **Fusion** – This relates to “eye teaming”, the ability of the *two* eyes to work together in acquiring visual information.

\_\_\_\_\_ **Tracking** – This relate to how the eyes to move across the written page and take in information efficiently and correctly.

This Classroom Vision Performance Screening indicates that a near vision performance, and/or visual acuity problem may be present. It is recommended that your child have an examination that would evaluate eye health and refractive (visual acuity) needs and make a detailed analysis of the visual performance skills. Please bring this letter with you to your doctor's office at the time of your child's examination and ask for the above skills to be tested thoroughly. If your child is already under care of an eye doctor, you may wish to bring this to their attention.

*Please contact your school's FAN coordinator for further information and assistance. The Bend-La Pine School District is not responsible for examination or treatment fees. This screening was performed by volunteers in the community and does not take the place of a comprehensive eye examination. No prescription for eyeglasses can be given based on the information collected and the volunteer screeners are not responsible for “false referrals”.*

N A T I O N A L  
Children's Vision  
F O U N D A T I O N

Dear Parent or Guardian:

The National Children's Vision Foundation (NCVF) and volunteers under the direction of the NCVF will be conducting vision screenings on all second and fourth graders in the Bend-LaPine school district as well as individual student referrals. This screening was added to the school district strategic plan in 2001 as an important tool to help increase student's overall classroom performance.

#### Vision Performance Screenings

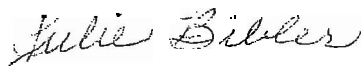
We are starting our third year and would like to take this opportunity to explain the program in more detail. These screenings will be ongoing from October to February. It checks for near and distance acuity, convergence, fusion, depth, and tracking. Each of these skills can have a significant effect on a child's ability to learn and stay interested in school.

Please review the vision screening report to see how your child performed in each of the skills they were tested for. When one or more of these skills have been determined by the NCVF to be unsatisfactory as revealed by the screening process, we recommend that the student visits an eye care professional as soon as possible. (As with any screening it is possible for a child to perform poorly on any area for a variety of reasons. Although we have developed a method to verify the results, it is important that you understand that "false positives" can occur.)

All eye examinations are designed to test vision and eye health. Some are also designed to test for the skills identified in our screening. When making your appointment, ask whether tests for each visual skill that has been indicated on the vision screening report will be evaluated. If you have any questions or concerns, please call me at 330-1001.

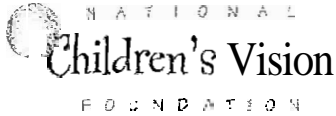
Remember, simply achieving a 20/20 score (visual acuity) does not mean in any way that your child's eyesight is necessarily suitable for the challenges of student learning.

Sincerely,



Julie Bibler

NCVF Screening Coordinator



2491 NE Twin Knolls  
Bend, OR 97701

Phone 541-330-1001  
Fax 541-318-9395

## VISION EXAMINATION REPORTING FORM

Doctor,

We would appreciate if you could take the time to complete this form and fax it to our office at 541-318-9395, **after** you have examined the student. This information will allow us to verify our screening results for future screenings.

Examining Doctor \_\_\_\_\_ Date \_\_\_\_\_

Student Name \_\_\_\_\_ Grade Level \_\_\_\_\_

School Name \_\_\_\_\_

Test Results:

Prescription Needed for: circle one Distance Near Always

Stereopsis: \_\_\_\_\_ Test Used: \_\_\_\_\_

Binocular Stability: \_\_\_\_\_ Test Used: \_\_\_\_\_

Convergence: \_\_\_\_\_

Color Vision:

Oculomotility: Pursuits: \_\_\_\_\_ Test Used: \_\_\_\_\_

Saccades: \_\_\_\_\_ Test Used: \_\_\_\_\_

Dilated Fundus Examination: circle one yes no

Cycloplegic Refraction: circle one yes no

Eye Health Conditions: \_\_\_\_\_

Special Lighting or Working Conditions: \_\_\_\_\_

Special Recommendations: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Do you recommend vision therapy for this child? circle one yes no

Has this child undergone or is currently receiving vision therapy? circle one yes no

As the parent/guardian of \_\_\_\_\_ I give authorization for this  
information to be shared with NCVF \_\_\_\_\_

Signature



## **Vision Follow up Survey**

Teachers,

As this school year draws to an end we, at the National Children's Vision Foundation (NCVF), are interested in knowing how many of the Bend-LaPine school district students ~~who~~ were referred out by the Foundation actually followed through with a professional exam. We would appreciate having you take a minute to answer a few questions regarding the below student, and return this form to your school office. This information is important for the continuation of the vision screening program, which we hope has been helpful to you and your students.

Thanks for your help!!

**Student**\_\_\_\_\_

Teacher\_\_\_\_\_

Referred for:      Acuity\_\_\_\_      Convergence \_\_\_\_  
                         Fusion \_\_\_\_      Tracking\_\_\_\_

Has had a professional exam?    Yes\_\_\_\_    No\_\_\_\_    Don't know\_\_\_\_

Has new glasses?                      Yes\_\_\_\_    No\_\_\_\_

Is having vision therapy?            Yes\_\_\_\_    No\_\_\_\_

Have you noticed any improvement in the student?    Yes\_\_\_\_ No\_\_\_\_

Any comments?

\_\_\_\_\_  
\_\_\_\_\_

If you would like for the NCVF to do a follow up with the student's family, please fill out the space below.

Parents name: \_\_\_\_\_

Address: \_\_\_\_\_

Phone number: \_\_\_\_\_

**The future is in sight!!**